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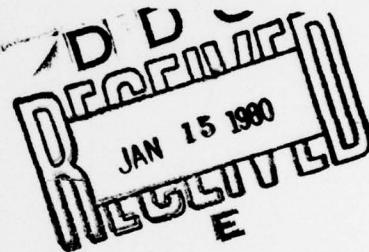
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TESTS OF FIEDLER'S SCREEN MODEL OF LEADERSHIP

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PERSONNEL AND MANPOWER TECHNICAL AREA

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that is, a male. Additionally, the more intelligent groups with positive attitudes toward women performed better on the structured task when led by a woman than when led by a man. No other screening effects were found. The report is written for psychologists.

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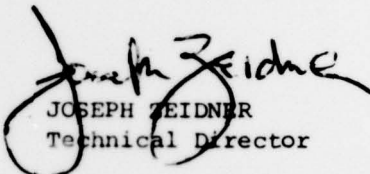
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FOREWORD

An important part of the research of the Personnel and Manpower Technical Area of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) supports the overall effort to integrate women more completely into the Army. Leadership is a specific and important area in which women will contribute to the Army in the future.

This report explores the effects of the sex and the intelligence of the leader on the performance of small groups in a controlled setting; it is based on supplementary analyses of data from two larger projects. The primary research, "A Longitudinal Evaluation of the Admission of Women to the U.S. Military Academy" (Project Athena), was supported by Army Project 2Q161102B74F, under grant MDA903-78-G-0002 to the U.S. Military Academy at West Point, N.Y. Data were also used from Project Sentinel, which was performed under research grant DAHCl9-77-G-0008 by personnel of the U.S. Military Academy and the State University of New York at Buffalo.


JOSEPH ZEIDNER
Technical Director

TESTS OF FIEDLER'S SCREEN MODEL OF LEADERSHIP

BRIEF

Requirement:

To analyze experimental data on the relationship between intelligence of group leaders and members and the effectiveness of group performance, and on factors that may modify this relationship.

Procedure:

Leaders were 36 male and 36 female freshmen cadets at the U.S. Military Academy; each led a group of three male freshmen cadets. Each group performed a structured and an unstructured task. The structured task required each group to make a scale drawing of a building; this task had an objectively correct result. The unstructured task required each group to write a proposal outlining ways for junior officers to maintain high standards and increase reenlistment.

Findings:

The leader's intelligence was positively and significantly correlated with group performance only on the structured task when the followers held traditional attitudes and the leader was male. The group's intelligence was positively and significantly correlated with group performance on the structured task when the followers held liberal attitudes toward women and the leader was female.

Utilization of Findings:

It may be useful for project directors to consider the gender and intelligence of a leader, as well as the attitudes of followers, when assigning leadership roles.

TESTS OF FIEDLER'S SCREEN MODEL OF LEADERSHIP

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TESTS OF FIEDLER'S SCREEN MODEL OF LEADERSHIP

INTRODUCTION

Fiedler has long been interested in the relationship between intelligence of group members and the effectiveness of group task performance. Implicit in this concern has been the commonsense notion that groups with more intelligent leaders (and/or followers) should perform more effectively on most assigned group tasks than should groups with less intelligent leaders (and/or followers). However, a great deal of small-groups research showed that this positive relationship between intelligence and group task performance was not always found in empirical studies. Fiedler and his associates have tried to identify the conditions under which this positive relationship holds.

In the first effort to integrate such results, Fiedler and Meuwese (1963) examined the relationship between the leader's intelligence and group performance in a variety of field and laboratory settings. They concluded that the correlation between leader's intelligence and group performance was substantial only for groups with high cohesiveness. The relationship was essentially zero among groups with low cohesiveness.

Several years later, Blades and Fiedler (1973) considered leader characteristics that moderated the relationship between follower intelligence and group performance. With several samples of military personnel, they found positive and significant correlation between average follower intelligence and group task performance among groups with relationship-oriented (high-LPC [least-preferred coworker]) leaders. Among groups with task-oriented (low-LPC) leaders, this relationship was essentially zero.

More recently, Fiedler and Leister (1977) expanded their analysis of the relationship between leader intelligence and group performance. They presented a theoretical model identifying factors that can "screen" out the impact of leader intelligence on group performance. These screening variables interfere with the influence that leader intelligence normally has on group performance. Fiedler and Leister (1977) presented empirical findings from several different research settings that support the presence of these screen variables.

For example, Fiedler and Leister (1977) identified one screening variable to be a stressful relationship with one's boss. When there was little stress with the boss, the intelligence of Army infantry squad leaders was positively correlated with ratings of effective performance in the military. In contrast, the researchers found no relationship between intelligence and performance for leaders working under stressful conditions. The overall correlation of intelligence and performance would be insignificant; however, when the researchers identified the appropriate screening variable (in this case, stress), a significant relationship between intelligence and performance was uncovered.

The data collected for Project Sentinel (Rice, Bender, & Vitters, 1979) provide an opportunity to explore further the operation of such screening variables. Although not originally designed to test such effects, this data set does include the following necessary variables to conduct such tests:

- American College Test (ACT) and/or Scholastic Aptitude Test (SAT) scores for both leaders and followers, which can be interpreted as a measure of general intelligence;
- Objective measures of group performance on two tasks; and
- Personality and demographic variables, which can be tested as potential screen variables.

Consistent with the general aim of Project Athena, our primary concern is the potential screening effect of the leader's sex and the followers' sex-role attitudes, as measured by Spence and Helmreich's (1972) Attitudes toward Women Scale. One hypothesis was that the correlation between leader's and followers' intelligence and group performance is weaker in groups with female leaders than in groups with male leaders. The basis for this prediction is the belief that the female leaders must deal with sex-role issues not faced by male leaders. There is much research indicating that the leadership role is essentially a masculine one (Lockheed, 1977; Megargee, 1969; O'Leary, 1974; Schein, 1973). Thus, the energy devoted to such maintenance issues may dilute the impact of intellectual resources of female leaders and their followers. We also hypothesized, based on a similar rationale, that the screening effect would be especially strong for groups composed of female leaders and followers with traditional attitudes toward female sex roles.

The variety of personality and demographic variables available from the Project Athena data file allowed us to explore many other variables as potential screens. For these exploratory analyses, no specific hypotheses were formulated.

METHOD

Subjects

The subjects were 36 male and 36 female freshmen cadets at the U.S. Military Academy at West Point, N.Y. Each cadet led a group of three men, who were also freshmen cadets.

Procedure

Intelligence was measured by the cadet's standardized scores on the verbal and math parts of the SAT. When either score was missing for a cadet, it was replaced with either the cadet's standardized verbal or math score on the ACT.

Because the procedures of the Project Sentinel are described in detail in another report (Rice, Bender, & Vitters, 1979), only a brief overview is presented here. Each cadet led a three-man group that conducted two experimental tasks. Performance was defined as the group's scores on these two tasks. The first task was structured; that is, there was an objectively correct outcome. The group worked together to make a scale drawing of a building, and performance was based on the number of lines correctly placed on the drawing. The second task, which was unstructured, required that the group write a proposal outlining ways for junior officers to maintain high standards and increase reenlistment rates in their units. Raters assessed the originality, practicality, and organization of the ideas expressed in the proposal.

Several possible leader screening variables were identified. Three of these were subgrouping variables: sex, LPC ratings (Fiedler, 1967), and attitudes toward women (Spence, Helmreich, & Stapp, 1973). Four continuous variables were also studied: scores on the Rotter I-E Locus of Control Scale (Rotter, 1966); male- and female-valued items on the Personal Attributes Questionnaire (Spence, Helmreich, & Stapp, 1974); self-concept as measured by the Tennessee Self-Concept Scale; and rating of leadership behavior as judged by peers and leaders of the cadet's unit (Priest, 1975).

Analyses

A screening hypothesis is similar to that of interaction, except that the hypothesis involves at least one continuous, measured predictor, whereas the predictors (or independent variables) in an interaction are discrete. The criterion--performance--is continuous in either case. One predictor--intelligence--is also a continuous variable; therefore, it is desirable to look at its correlation with performance, rather than dichotomize it or break it into categories necessary for analysis of variance.

Our screening variables are both discrete and continuous. Zedeck (1971) carefully differentiated modifier from moderator variables: "A true moderator is not a discontinuous qualitative variable that differentiates subgroups of individuals who are qualitatively different, but is a continuous quantitative variable, and individuals distribute along its continuum" (p. 305). Zedeck calls this definition of the moderator variable as a continuous variable the "crucial determinant of the operation of moderators" (p. 305). He suggests a moderated regression analysis to test moderator effects.

In the present study, hierarchical multiple-regression analyses were used, first entering intelligence and the screening variable, then entering their cross-products; that is, the interaction term. On the other hand, Zedeck refers to a modifier variable as a predictor which "...leads to different subgroup relationships between a predictor variable and criterion variable" (p. 297). Discrete screening or modifier variables should be tested by examining the significance of the difference of the correlations between intelligence and performance for each subgrouping of the modifier variable. This is in keeping with Fiedler and Leister's (1977) analyses. Thus, moderated regression analyses were conducted for each of the five continuous potential screens, and the three discrete variables were treated as modifiers.

RESULTS

The moderated regression analyses yielded no significant effects. However, the modifier variables proved to be quite interesting. The intelligence of male leaders was positively and significantly correlated with group performance on the drawing task when the group held traditional attitudes toward women ($r = .44, p < .05$; $r = .41, p < .05$, for verbal and math SAT, respectively; see Table 1). In other words, the leader's intelligence was correlated with group performance only when the followers held traditional attitudes and when the leadership role was filled by a person of the traditional gender--a male.

In attempting to discover the mechanisms that mediated this effect, we examined the leaders' and the groups' responses to a postsession questionnaire. It was found that the higher the intelligence of male leaders of groups with traditional attitudes toward women, the more highly the leader rated his importance to the group ($r = .51, p < .05$; $r = .45, p = .06$, for verbal and math SAT, respectively) and the cooperation of group members ($r = .43, p = .06$; $r = .41, p = .09$). The intelligence of the leaders also positively correlated with their level of consideration for group members ($r = .48, p < .05$; $r = .47, p < .05$). Thus, the traditional leader of followers with traditional attitudes felt important and helped, and he in turn exhibited consideration toward these supportive followers.

Followers with liberal or traditional attitudes toward women who were led by a male leader did not differ in their ratings of the leader's importance to the group, the appropriateness of his behaviors, his consideration of group members, his fulfillment of duties, his motivation, his ability to lead, and how hard he worked. These groups were also similar in their ratings of the group's atmosphere and the members' motivation and cooperation.

However, liberal and traditional groups led by a male leader differed significantly in their ratings of the leader's ability to initiate structure. Traditional groups ($\bar{X} = 91.67$) reported more effective initiation of structure by male leaders than did liberal groups ($\bar{X} = 82.39$,

$F(1, 34) = 5.91, p = .021$). Since the leader's ability to initiate structure is an important characteristic when the group's task is a structured one (such as the drawing task), it is reasonable that the modifier effect was found for this task only and that the leader's ability to initiate structure significantly differentiated the responses of the liberal and traditional groups.

Table 1
Correlations of Leader's Intelligence With Performance
on the Structured Task

Verbal SAT/ACT		
Attitudes toward women	Leader's sex	
	Male	Female
Liberal	-.27 _a	.23
Traditional	.44* _b	.11
Math SAT/ACT		
Liberal	-.38* _c	.26
Traditional	.41* _d	.17

* $p < .05$.

Note. The difference between pairs of correlations was tested using Fisher's z-approximation. Significantly different pairs are indicated by subscripts ($z_{ab} = 2.06, p < .05$; $z_{cd} = 2.27, p < .05$). There are 18 leaders in each cell.

A second interesting effect was found when the intelligence of the group--the combined SAT scores of the three male followers and the leader--rather than the leader's intelligence only was studied. Of those groups with liberal attitudes toward women, the intelligence of the group positively and significantly correlated with the group's performance when the group was led by a woman ($r = .40, p < .10$; $r = .51, p < .05$). In other words, more intelligent groups with liberal attitudes toward women performed better on the drawing task when led by a women than when led by a man (see Table 2). There were no significant effects for the proposal task.

Table 2
Correlations of Group Intelligence With Performance
on the Structured Task

Verbal SAT/ACT		
Attitudes toward women	Leader's sex	
	Male	Female
Liberal	-.26 _a	.40 _b
Traditional	.18	.17
Math SAT/ACT		
Liberal	-.26 _c	.51* _d
Traditional	.30	.05

*p < .05.

Note. The difference between pairs of correlations was tested using Fisher's z-approximation. Significantly different pairs are indicated by subscripts ($z_{ab} = 1.90$, $p < .06$; $z_{cd} = 2.27$, $p < .05$). There are 18 groups in each cell.

DISCUSSION

It is interesting that none of the individual personality variables, such as locus of control and LPC, proved to be significant moderator or modifier variables. The groups' attitudes toward women and the leader's sex were interesting and interactive screening variables. Because the subjects were from the first class at West Point to include women, it is reasonable to find that the leader's sex and attitudes toward women were salient screening variables. Notions involving women's roles may have been foremost in the minds of most cadets, male and female, at that time.

The fact that modifier effects were found for performance on the structured task only is noteworthy. The key may lie in the operational definition of intelligence. In the present study, intelligence was defined as scholastic aptitude, which involves skills that may be most relevant to a structured task. Measures of leaders' creativity, for example, may be more relevant to a group's performance on an unstructured task requiring originality.

The most interesting outcome of these analyses is that the followers' attitudes and leader's sex interacted as significant modifier variables. There was no simple effect of the leader's sex. Instead, the leader's intelligence and group performance were related only under certain conditions involving both the followers' and the leader's characteristics. Clearly, this supports the notion that leadership involves a transactional process between the leader and the group (Hollander, 1978).

Specifically, when the leader is male and intelligent, group performance on a structured task is maximized when the followers hold traditional attitudes toward women. More intelligent groups perform well on the structured task when the followers are supportive of an egalitarian role for women and the leader is a woman. It may be useful for project directors to consider the intelligence and sex of a leader, as well as the attitude of followers, when assigning a leader.

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